

Power spectrum consistency among systems and transducers.

Guerrero QW, Fan L, Brunke S, Milkowski A, Rosado-Mendez IM, Hall TJ (2018) Power spectrum consistency among systems and transducers. *Ultrasound Med Biol* 44(11), 2358-2370.

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Abstract

Use of the reference phantom method for computing acoustic attenuation and backscatter is widespread. However, clinical application of these methods has been limited by the need to acquire reference phantom data. We determined that the data acquired from 11 transducers of the same model and five clinical ultrasound systems of the same model produce equivalent estimates of reference phantom power spectra. We describe that the contribution to power spectral density variance among systems and transducers equals that from speckle variance with 59 uncorrelated echo signals. Thus, when the number of uncorrelated lines of data is small, speckle variance will dominate the power spectral density estimate variance introduced by different systems and transducers. These results suggest that, at least for this particular transducer and imaging system combination, one set of reference phantom calibration data is highly representative of the average among equivalent transducers and systems that are in good working order.

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Leibniz-HKI-Authors



Sascha Brunke

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